

ENVIRONMENTAL ASSESSMENT

DIAMOND SPRINGS WIND PROJECT
HABITAT CONSERVATION PLAN
FOR THE
AMERICAN BURYING BEETLE

U.S. FISH AND WILDLIFE SERVICE

OCTOBER 3, 2019

TABLE OF CONTENTS

1.0	INTRODUCTION, NEED AND PURPOSE AND DECISION TO BE MADE	1-1
1.1	Purpose and Need AND DECISION TO BE MADE	1-1
1.1.1	Purpose and Need for the Proposed Action	1-1
1.1.2	Decision to be Made	1-2
2.0	ALTERNATIVES	2-1
2.1	No-Action Alternative	2-1
2.2	Proposed Alternative: Issuance of an Incidental Take Permit	2-1
2.2.1	Plan Area	2-1
2.2.2	Covered Activities	2-2
2.2.3	Covered Species	2-5
2.2.4	Conservation Measures	2-5
2.2.5	Mitigation.....	2-6
3.0	AFFECTED ENVIRONMENT	3-1
3.1	Cultural Resources	3-3
3.2	Geology/Soils	3-3
3.2.1	Prime Farmlands	3-4
3.3	Vegetation.....	3-4
3.4	Visual Resources	3-4
3.5	Noise	3-5
3.6	Water Resources/Water Quality.....	3-6
3.7	Wetlands/Waters of the U.S.	3-6
3.7.1	Applicable Regulatory Programs.....	3-6
3.7.2	Identification of Potential WOTUS.....	3-7
3.7.3	Potential Waters of the U.S. Subject to Section 404 of the Clean Water Act.....	3-7
3.8	Wildlife	3-7
3.8.1	General Wildlife	3-7
3.8.2	Bald Eagle and other Raptors.....	3-9
3.8.3	Threatened and Endangered Species	3-10
4.0	ENVIRONMENTAL CONSEQUENCES	4-1
4.1	Proposed Alternative	4-1
4.1.1	Cultural Resources	4-1
4.1.2	Geology/Soils	4-2
4.1.3	Vegetation.....	4-3
4.1.4	Visual Resources	4-4
4.1.5	Noise	4-5
4.1.6	Water Resources/Water Quality.....	4-6
4.1.7	Wetlands/Waters of the U.S.	4-7
4.1.8	Wildlife	4-8
4.2	No Action Alternative.....	4-12
4.3	Cumulative impacts.....	4-13
4.4	Irreversible and Irretrievable Commitment of Resources	4-15
4.5	Short-term Use of the Environment versus long-term Productivity.....	4-16
5.0	CONSULTATION AND COORDINATION	5-1
6.0	REFERENCES	6-Error! Bookmark not defined.

LIST OF TABLES

Table 2-1 - Estimated Temporary and Permanent Impacts to Favorable and Unfavorable Habitats	2-2
Table 3-1 - Resources and Rationale for Elimination or Detailed Analysis	3-1
Table 3-2 - Viewpoints Selected for Visual Analysis	3-5
Table 3-3 - Crosstimbers Region Terrestrial Wildlife Species of Greatest Conservation Need	3-8
Table 3-4 - Birds of Conservation Concern in the Oaks and Prairies Region (BCR 21).....	3-8
Table 3-5 - Federally-Listed Species Considered for Analysis	3-11
Table 4-1 - Estimated Temporary and Permanent Impacts to Favorable and Unfavorable ABB Habitats	4-2
Table 4-2 - Acres of Disturbance by Landcover Type in the Proposed Plan Area	4-4
Table 4-3 - Maximum Noise Levels at 50 Feet for Common Construction Equipment	4-5
Table 4-4 - Estimated Take Based on Proposed Disturbance to Occupied Favorable ABB Habitats*	4-12

1.0 INTRODUCTION, NEED AND PURPOSE AND DECISION TO BE MADE

The U.S. Fish and Wildlife Service (Service) has prepared this Environmental Assessment (EA) in accordance with the National Environmental Policy Act (NEPA) of 1969, as amended (42 United States Code [USC] 4321 *et seq.*), and its implementing regulations in the Code of Federal Regulations (CFR) at 40 CFR §§ 1500, and section 10(a)(1)(B) of the Endangered Species Act (ESA) of 1973, as amended (16 USC § 1532). This EA has evaluated the impacts of, and alternatives to issuance of an Incidental Take Permit (ITP) to Diamond Spring Wind LLC. An application for an ITP was submitted by Diamond Spring Wind LLC on February 15, 2019 along with the proposed *Diamond Spring Wind Project Habitat Conservation Plan for American Burying Beetle* (HCP). The Applicant, Diamond Spring Wind, LLC, prepared an HCP to address incidental take of the endangered American burying beetle (*Nicrophorus americanus*, ABB) from the Applicant's construction of the proposed wind energy project. This EA provides an evaluation of potential impacts on the human and natural environment resulting from issuance of an ITP, which includes implementation of the proposed HCP, including avoidance and conservation measures described in the HCP.

The *Plan Area* for the HCP includes areas where authorized incidental take could occur and conservation measures would take place. The Plan Area is defined as those areas that would receive either temporary or permanent ground disturbance during construction. The Plan Area, approximately 930.4 acres, is located on privately-owned land within portions of Johnston and Pontotoc Counties, Oklahoma (**Figures 1 and 2**). ABB have been detected in the proposed Plan Area. The proposed project is within the range of the ABB, but the proposed project is located outside of the Conservation Priority Area for the federally-listed ABB.

The results of surveys and habitat modeling indicate an estimated 19,533.2 acres of favorable habitat and 4,521.5 acres of unfavorable habitat within the proposed project boundary or Project Area (24,054.7 acres). The Plan Area, defined above, occupies 930.4 acres within the Project Area. The Permit Area occupies 568.7 acres within the Plan Area and represents all areas of temporary and permanent disturbance within occupied-favorable and unevaluated-favorable ABB habitat as defined by presence-absence surveys completed for the Project (Search 2018, Appendix A) and habitat favorability modeling completed for the Project (Search 2018; Appendix B). Take authorization is sought for the 568.7-acre Permit Area. Of the total 568.7 acres of disturbance within the Permit Area, an estimated 521.1 acres would be temporary disturbance and 47.64 acres would be permanent disturbance (Table 2 Final HCP 9-18-19). The temporary and permanent ground disturbance impacts proposed for each construction activity used to define the Permit Area are fully described in Section 1.2 of the HCP.

This document provides the required NEPA documentation for a federal action (Issuance of an ITP under section 10(a)(1)(B) of the ESA). It also provides baseline information and discussion of impacts to the human and natural environment that may occur as a result of implementing the HCP and potentially resulting from implementation of the covered activities during the HCP term.

1.1 PURPOSE AND NEED AND DECISION TO BE MADE

This EA has been prepared to provide an assessment of potential impacts resulting from the proposed federal action (approval of the HCP and subsequent issuance of an incidental take permit) on the human and natural environment.

1.1.1 Purpose and Need for the Proposed Action

The purpose of the federal action is to address the application for an ITP to authorize take of the federally-listed ABB for the Applicant's Covered Activities in the Permit Area. If the conditions under section 10(a)(2)(B) are met, then the Service shall issue an ITP for covered activities associated with the proposed project.

The Service's need for the proposed action is to respond to the Applicant's HCP and application for an ITP related to the Applicant's activities that have the potential to result in take of threatened and endangered species, pursuant to the ESA Section 10(a)(1)(B) and its implementing regulations and policies. Once the Service receives an application for an ITP, the Service must review the application to determine if it meets issuance criteria. The Applicant's need for incidental take authorization occurs when the likelihood exists that the federally listed ABB could be taken, as that term is defined by the Endangered Species Act of 1973 (ESA), by a covered activity.

1.1.2 Decision to be Made

The Service's decision to be made is whether or not to issue an Incidental Take Permit under section 10(a)(1)(B) of the Endangered Species Act to Diamond Spring Wind for incidental take for the ABB as a result of their proposed projects activities.

2.0 ALTERNATIVES

An EA examines the impacts of a proposed federal action on the human and natural environment. In this case, the Proposed Action is approval of the HCP and subsequent issuance of a permit to authorize incidental take of the covered species (ABB) that may result from implementation of the covered activities. With respect to this EA, the Service has analyzed in detail the Proposed Alternative and the No-Action Alternative. The No-Action alternative demonstrates the consequences of not approving the HCP and not issuing a subsequent permit.

2.1 NO-ACTION ALTERNATIVE

Under the No-Action Alternative, the Service would not issue the ITP. The Applicant would not be in compliance with the Endangered Species Act, and may or may not decide to construct the proposed wind energy project. Therefore, the No Action Alternative consists of two options: Option A – No Project Construction and Option B – Project Construction without an ITP. Under the Option A scenario, there would be no take of the ABB as a result, and no renewable wind generated energy would be made available to public utilities. Current land uses in the Plan Area, dominated by ranching, would continue. Under the Option B scenario, unlawful take of the ABB would occur and the applicant would be in violation of the Endangered Species Act.

The No-Action Alternative would be implemented if the Service denied issuance of an ITP or if the Applicant chose to abandon the proposed wind energy project. Denial of an ITP would prevent the Applicant from lawfully proceeding with the covered activities because of the risk that implementation of covered activities would result in take of the ABB. In either scenario, failure to implement the covered activities in the HCP would avoid all potential project-related impacts on the ABB, including the potential for take.

2.2 PROPOSED ALTERNATIVE: ISSUANCE OF AN INCIDENTAL TAKE PERMIT

Under the proposed alternative, the Service would approve the HCP and issue a five-year ITP to the Applicant for incidental take of the ABB for covered activities in the Permit Area. The Applicant would implement the HCP, which is summarized here. This alternative is the Service's preferred alternative.

2.2.1 Plan Area

The *Plan Area* for the HCP is defined as those areas where all covered activities described in the HCP, including all temporary and permanent ground disturbance, would occur during Project construction and subsequent site reclamation. The temporary and permanent ground disturbance impacts proposed with each construction activity, which were used to define the Plan Area, are fully described in Section 1.2 of the HCP. The Plan Area includes an estimated 930.4 acres of favorable and unfavorable habitat, as determined by modeling completed by Smith Environmental and Research Consulting House (SEARCH 2018).

2.2.2 Permit Area

The Permit Area is a subset of the Plan Area where proposed temporary and permanent disturbance would occur within occupied-favorable and unevaluated-favorable ABB habitats. USFWS protocol-level presence-absence surveys were completed in the late-season survey period in 2019 in an effort to define occupied favorable habitat (SEARCH 2019; Final HCP Appendix B). Incidental take coverage for ABB (Permit Area) is limited to 568.7 acres of occupied-favorable or unevaluated-favorable habitats, as

defined by the 2019 late-season presence-absence surveys completed for the Project (Search 2019, Final HCP Appendix B). **Table 2-1** presents a summary of the temporary and permanent disturbance acres associated with proposed ground disturbing activities.

Table 2-1 Estimated Temporary and Permanent Impacts to Favorable and Unfavorable Habitats			
Ground Disturbing Construction Activity	Occupied-Favorable Unevaluated-Favorable Habitats (acres)	Unfavorable Habitat (acres)	Subtotal (acres)
Permanent Impacts	47.64	44.79	92.43
T-Line Poles	0.01	0.0	0.01
Met Tower	0.07	0.03	0.10
O&M	0.0	5.0	5.0
Access Roads	45.33	33.43	78.76
Substation	0.0	5.0	5.0
Turbines	2.24	1.32	3.56
Temporary Impacts	521.1	316.89	837.99
Collection Lines	148.6	93.46	242.06
Gen-tie Access Road	34.4	14.44	48.84
Gen-tie Structure Assembly Area	9.5	3.68	13.18
Laydown Yard	0	15	15
Met Tower	0.18	0.0	0.18
Access Roads	60.55	43.9	104.45
Turbines	130.69	78.4	209.09
Crane Paths	137.18	68.01	205.19
Grand Total (acres)	568.74	361.68	930.42

Source: Table 3 Final HCP (9-18-19)

2.2.3 Covered Activities

As part of the proposed project, 112 wind turbine generators would be constructed and operated. These turbines would have a capacity of approximately 303.6 megawatts (MW). For purposes of providing turbine siting flexibility, a total of up to 137 turbine locations (including 112 primary locations and 25 alternate locations) have been evaluated in the HCP. The proposed project also includes construction of project-related roads, buried collection lines, an Operations and Maintenance (O&M) building, three permanent meteorological towers, a collection substation, a temporary construction laydown area, temporary crane paths, and a 345-kilovolt (kV) 16.2-mile overhead transmission line to provide interconnection to an existing transmission line located approximately 12 miles south of the proposed project.

Proposed activities that have the potential to take ABB are fully described in the HCP. If an ITP is issued by the Service, the following covered activities would be included in the ITP.

Site Preparation, Clearing, and Construction

These activities would include all construction work within the ABB occupied-favorable and unevaluated-favorable habitat. Site preparation work would include clearing and/or removing

vegetation from the land, grading, leveling, and possibly compacting the ground. These activities would be associated with installation of turbine pads, access roads, collector lines, collector substation, construction laydown area, temporary crane paths, meteorological towers, and aboveground transmission line poles.

Access Road Construction

New and improved roads would be constructed throughout the Plan Area to provide access to proposed project facilities including turbine sites, transmission pole locations, collection substation, and other proposed facilities. Road construction would include topsoil stripping and vegetation removal, as necessary. Topsoil would be stockpiled for use during restoration efforts. Constructed roads would be surfaced with gravel and have a finished width of 16 feet, with reclaimed shoulders of 12 feet on each side of the road.

Crane Paths

Two different types of cranes would be required to erect the turbines. A smaller crane would be used to install the turbine control system, as well as the base and lower tower sections. The smaller crane would also be used to assemble the rotor. A larger crane would be used to install the upper mid-tower and top-tower sections, nacelle, and rotor. Based on the size, weight, and slow travel speed of the larger crane, it cannot drive on public roads. As such, cross-country crane paths would be established and used by the larger crane to gain access to the proposed turbine locations. These crane paths would be 60 feet wide and would typically parallel Project access roads. In some instances, the larger crane would be partially disassembled and transported from one tower location to another by a specialized flatbed tractor-trailer.

Turbine Site Construction

Each turbine would be supported by a concrete foundation. Excavations for the foundation at each turbine site would be approximately 75 feet wide and 9 feet deep. In addition to excavating the foundation, an area adjacent to each proposed turbine location would be used to store and assemble the wind turbine.

Collector Lines

An underground 34.5-kV collection system would connect the wind turbines to the collection substation. A trenching machine would be used to create a trench that would be between 24 and 36 inches wide. Collection lines would be buried in the trenches at depths between 36 and 48 inches. Replacement of spoil material would occur after collection lines are placed in the trenches. Subgrade soils would be replaced at the bottom of the trenches and topsoil would be replaced on the surface. Direct burials would require minor clearing and surface disturbance (up to 40 feet wide for the installation machinery and access).

Collector Substation

The purpose of the collector substation would be to step up the voltage from 34.5 kV to 345 kV, so it can be delivered to the substation at the point of interconnection via the proposed Project transmission line. The collection substation would occupy approximately 5 acres and be surrounded by a chain link fence. The substation would be accessed using a permanent gravel access road and would require an additional acre of temporary disturbance during construction.

Laydown and Staging Areas

The Project would include development of a temporary laydown yard for use during construction activities. To accommodate the laydown/staging area, approximately 15 acres would be cleared of

vegetation and graded level. The laydown/staging area would be the location for temporary construction offices, temporary construction facilities, and materials/supply storage.

Operations and Maintenance Building

The Operations and Maintenance building would occupy an estimated 5-acre site. This building would be used to store equipment and supplies required for operations and maintenance of the Project and to provide office space for project personnel. The building, associated parking, and storage area would be encompassed within the 5-acre permanently impacted area.

Permanent Meteorological Towers

Three 295-foot (90-meter) tall permanent meteorological towers would be erected to collect site-specific wind data. These towers would be lattice, unguyed, galvanized steel structures equipped with wind velocity directional measuring instruments at three different heights on each tower. Each tower would rest on a 3-foot by 3-foot steel base plate and require a 50-foot by 50-foot gravel area at the base. Temporary disturbance associated with each tower would include an estimated 100-foot diameter area centered on the tower.

Transmission Line Poles

The proposed transmission line would be a 16.2-mile long 345 kV transmission line that would interconnect to the Johnston County substation located approximately 12 miles south of the Project site. Pole structures that would support the transmission lines would be between 115 and 150 feet tall with spans between poles between 600 and 800 feet. Each pole structure would be an H-frame and include two poles, except for turning structures that may be a single pole. In most cases, borings for each pole would likely be between 10 and 13 feet deep and approximately 18 inches in diameter. Excavated soil material would be used to back-fill each hole, with access material spread in the area around each pole.

Based on the relatively low vegetation height throughout much of the Plan Area, vegetation clearing/removal would likely be limited. Vegetation may be removed for the access road to the transmission line corridor and for small areas associated with transmission line structures that are within structure assembly areas.

Post-Construction Reclamation

Post-construction reclamation would be implemented in areas temporarily disturbed during construction. Post-construction activities associated with reclamation and revegetation of the construction work areas would be initiated during the appropriate growing season following completion of construction of the Project and would include:

- During reclamation of temporary roadbeds, aggregate would be removed and transported offsite or stockpiled onsite for the separation of salvageable material.
- Re-grading to pre-construction contours would be conducted where feasible.
- Stockpiled soils would be distributed on reclaimed areas.
- Excess fill would be placed around foundation bases or in other appropriate areas.
- Topsoil would be redistributed across the surface of the restored construction disturbance work areas.
- Compacted soils would be loosened as determined where necessary and practical, in order to encourage plant growth.
- Soil amendments, if needed, would be added to seed beds.

- Reclaimed areas would be mulched or hydroseeded with the application of appropriate Best Management Practices (BMPs) to protect the soil surface from wind and water erosion.
- Revegetation efforts would be monitored.
- In accordance with the Oklahoma Noxious Weed Law, Canada thistle, musk thistle, and Scotch thistle would be treated and, if necessary, treatments would be repeated in areas that were originally unsuccessfully treated.
- Areas would be repaired if initial reclamation/revegetation efforts are unsuccessful to ensure reclamation success during the term of the permit.
- Native seed mix shall be used, unless otherwise specified by the landowner.
- Reclaimed land would be returned to original contours to the maximum extent practicable.

2.2.4 Covered Species

Incidental take coverage would only be provided for the ABB for the Covered Activities and the ABB is the only species addressed in the HCP. A detailed species account of the ABB can be found in the ABB survey report that was completed for the proposed wind project (SEARCH 2019, Appendix B Final HCP).

2.2.5 Conservation Measures

Several conservation measures are included in the Proposed Alternative. These include:

- Stormwater BMPs, including the use of certified weed-free straw.
- Limiting clearing in temporary work areas
- Limiting use of vehicles, machinery, or heavy equipment
- Limiting use of artificial lighting
- Relief of soil compaction
- Revegetation of temporary work areas
- Construction personnel training
- Bird diverters on guyed wires

As indicated in the BBCS prepared for this project (DSW 2019), DSW has committed to implement voluntary measures to avoid and minimize impacts to birds that might occur as a result of Project construction and operations. Such avoidance and minimization measures include setting back turbines from an existing bald eagle nest within the Project boundary to avoid and minimize disturbance and operational impacts, implementing a carrion removal program to reduce attraction of bald eagles and other raptors to the Project area, and following other standard best management practices identified in the Land-based Wind Energy Guidelines (FWS 2012).

To further avoid potential construction-related impacts on bald eagles in the short-term, DSW will avoid impacts to nesting eagles by implementing buffers around existing eagle nests in which no construction activities will occur. DSW will implement the following measures during Project construction. These measures are derived from the National Bald Eagle Management Guidelines (USFWS 2007):

- Maintain a buffer of at least 660 feet (200 meters) between all construction activities and eagle nests (including active and inactive nests);
- Restrict all clearing, external construction, and landscaping activities within 660 feet of the nest to outside the nesting season (i.e., outside the nesting season is from August through mid-January); and

- Maintain any established landscape buffers.

Given the potential for bald eagle populations to expand in the Project area over the life of the Project, DSW will work in good faith with the USFWS to diligently pursue and obtain an Eagle Take Permit (ETP) that will authorize potential incidental take of bald eagles that might occur during Project operations. DSW will develop and submit an application for a long-term ETP for Project operations after ITP issuance in accordance with applicable agency regulations and policies.

These measures are described in greater detail in the Final HCP.

2.2.6 Mitigation

Impacts to ABB habitat from implementation of covered activities would be offset through conservation and management of ABB habitat in perpetuity, consistent with USFWS guidance (USFWS 2014). To offset these impacts, the project proponent would purchase ABB credits at a USFWS-approved conservation bank with a service territory that includes the Plan Area, or undertake other measures approved by the USFWS. Mitigation is described in greater detail in the Final HCP.

3.0 AFFECTED ENVIRONMENT

Analysis in this EA is focused on the estimated impacts of implementation of the Covered Activities on the ABB through issuance of an ITP. The affected environment is the area and its resources (i.e., physical, biological, and/or socioeconomic) potentially impacted by the proposed action and alternatives. The purpose of describing the affected environment is to define the context in which the impacts will occur. To make an informed decision about what actions to implement, it is necessary to first identify those resources potentially affected and the extent of the potential impacts. In describing those resources, we considered the potential impacts associated with the activities associated with implementation of the HCP for the ABB.

Implementation of the Covered Activities, as proposed in the HCP, would have impacts associated with construction activities during the five-year ITP period. Therefore, the analysis focuses predominately on those resources affected by construction and associated ground disturbance. Cumulative effects are also addressed. The assessment does not include detailed analyses of resources not affected by the Covered Activities.

Based on guidelines from the Council on Environmental Quality (CEQ) resources that will be unaffected by the Proposed Action or alternatives, experience beneficial effects, or are subject to temporary effects, were excluded from the effects analysis. **Chapter 2** of this EA and the HCP describe the Covered Activities associated with issuing a five-year ITP for the ABB and provides the basis for the determination of resources that could be affected. **Table 3-1** provides a summary of the resources potentially affected by the Proposed Action and described in Chapter 3 and which resources were eliminated from further consideration. Those resources identified as present and potentially affected are discussed in more detail in this EA.

Table 3-1 Resources and Rationale for Elimination or Detailed Analysis				
Resource	Not Present	Present, Not Impacted	Present, May be Impacted	Rationale
Air Quality		X		Implementation of covered activities would have limited temporary effects on air quality during construction and would not result in a violation of ambient air quality standards, because early analyses show that emissions from construction do not bring air quality indices of Johnston and Pontotoc counties above the state average (ODEQ 2019).
Cultural Resources			X	No significant known cultural resources occur in the Plan Area but isolated cultural resources and some historic resources are present (Blanton & Associates 2018a and b). See Section 3.1.

**Table 3-1
Resources and Rationale for Elimination or Detailed Analysis**

Resource	Not Present	Present, Not Impacted	Present, May be Impacted	Rationale
Environmental Justice / Socioeconomics		X		Implementation of covered activities would have beneficial impacts to the local economy by providing local tax revenues and high-paying jobs (Markwayne, 2019) and would not have disproportionately high adverse human health or environmental effects on low income and minority populations.
Prime Farmlands			X	Designated prime farmlands may occur in areas proposed for construction. See Section 3.2.1.
Hazardous Materials / Waste		X		Limited quantities of hazardous materials would be associated with the construction equipment used to implement the proposed covered activities. Their use would be temporary and controlled by required management plans and project documents. Fueling of equipment is expected to occur outside of ABB habitat.
Land Use		X		Land use, primarily livestock grazing, would continue during and after implementation of the covered activities.
Noise			X	Construction-related noise would be short-term and limited to the project area. Approximately 16 residential buildings are known to exist in the project area or within one mile. See Section 3.5.
Recreation	X			No publicly-accessible recreational resources exist within the proposed project area.
Geology / Soils			X	Soils would be disturbed during implementation of the Covered Activities. See Section 3.2.
Vegetation			X	Vegetation would be disturbed/removed during implementation of the Covered Activities. See Section 3.3.

**Table 3-1
Resources and Rationale for Elimination or Detailed Analysis**

Resource	Not Present	Present, Not Impacted	Present, May be Impacted	Rationale
Visual Resources			X	Construction of wind turbines and associated facilities would impact visual resources. See Section 3.4.
Water Resources			X	Implementation of Covered Activities and associated mitigation measures could affect local water bodies. See Section 3.6.
Wetlands / Waters of US			X	Implementation of Covered Activities and associated mitigation measures could affect wetlands / waters of the US. See Section 3.7.
Wildlife (including special status species)			X	Implementation of Covered Activities may impact locally occurring wildlife. See Section 3.8.

3.1 CULTURAL RESOURCES

In 2018, an evaluation of archeology and cultural resources was completed in the proposed Project Boundary (Blanton & Associates 2018a). This survey evaluated sites associated with proposed surface disturbance, including locations for the turbines, substation, transmission line, underground electric collection lines, and access road, plus an additional 500-foot buffer surrounding each disturbance. The following is a summary of the results of this survey.

The cultural resources survey covered a total of 6,361 acres. If the initial visual inspection of an area indicated the potential for the presence of intact subsurface archeological resources, a shovel test was completed. A total of 263 shovel tests were completed during the survey. Of these shovel tests, ten yielded cultural material. While two archeological sites and four isolated finds were identified, neither of these sites and none of the finds is recommended for eligible inclusion in the National Registry of Historic Places (NRHP). No significant cultural materials were encountered during the survey.

In 2018, a non-archeological historic resources survey of the proposed project was completed (Blanton & Associates 2018b). The purpose of this survey was to identify historic resources listed in or eligible for listing in the National Register of Historic Places (NRHP) within the area of potential effect (APE) and if any NRHP-listed or NRHP-eligible resources are located in the APE, to assess the potential effects of the proposed project on these resources. The APE for the proposed project includes lands within Johnston, Murray, and Pontotoc Counties, Oklahoma that are 1.5 miles from proposed turbine locations and other above-ground structures and 0.5 miles from the proposed transmission line.

Historians reviewed the Oklahoma State Historic Preservation Office's (SHPO) Oklahoma Landmarks Inventory and the National Park Service National Historic Landmark (NHL) list to identify known and listed historic resources. No NHL or NRHP-listed resources are known with the APE.

A reconnaissance-level survey completed by historians in June 2018 identified 109 historic resources located on 54 properties within the APE. The historians recommended that four resources could be considered NRHP-eligible properties containing historic resources. These four properties include a

commercial brick building in Mill Creek, several buildings near the intersection of East Main Street and Cherokee Avenue in Mill Creek that represent era-specific construction methods and architecture, Jacobs Ranch (formerly the Turner Ranch), and a building on Bellwood Road approximately 0.6 miles south of Chisholm Road in Johnston County.

3.2 GEOLOGY/SOILS

The proposed project is located in area associated with the Arbuckle Uplift. The Arbuckle Uplift is a mosaic of limestone, granite, dolomite, sandstone, and shale. Quaternary limestone and sandstone overlays the Precambrian-aged granite. Soils in the region are typically shallow, well drained loams, silt loams, and silty clay loams underlain by bedrock. In many areas within the proposed Project Area, bedrock is exposed or within several inches of the surface. Six soil mapping units cover the majority of the proposed Project Area. These include:

- Claremore-Rock outcrop complex, 1 to 5 percent slopes;
- Kiti-Rock outcrop complex, 1 to 25 percent slopes;
- Lula loam, 1 to 3 percent slopes;
- Scullin-Kiti complex, 2 to 6 percent slopes;
- Stephenville fine sandy loam, 3 to 5 percent slopes; and
- Verdigris silty clay loam, 0 to 1 percent slopes (USDA 2018).

3.2.1 Prime Farmlands

Based on NRCS information (USDA 2018), some of the soils in the proposed Project Area are characterized as prime farmland. Prime farmland is defined as land that has the best combination of physical and chemical characteristics for producing food, feed, forage, fiber, and oilseed crops and is also available for these uses. Unique farmland is defined as land used for production of specific high value crops.

Based on NRCS data, there are an estimated 10,770 acres of prime farmland with the proposed Project Area and 210 acres within the Plan Area.

3.3 VEGETATION

The proposed Project Area is located within rolling hills and plains of the Arbuckle Uplift within the Cross Timbers ecoregion (Woods et al. 2005). The Cross Timbers is a transitional zone between forested areas to the east and historically occurring prairies to the west. Native land cover types in the area include tall-grass prairies and post oak and blackjack oak forests. As shown on **Figure 3**, mapping efforts completed in 2018 identified four major cover types in the Project Area including deciduous forest, grassland/herbaceous, pasture/hay, and developed/open space (SEARCH 2018b).

Post oak and blackjack oak forests are typical of the Cross Timbers region. Across the region, this forest community is often associated with tallgrass prairies. As the name implies, this plant community is dominated by post oak (*Quercus stellata*) and blackjack oak (*Quercus marilandica*), but also includes black hickory (*Carya texana*), eastern cottonwood (*Populus deltoides*), black walnut (*Juglans nigra*), American elm (*Ulmus americana*), and pecan (*Carya illinoensis*). Grasses common in the region include little bluestem (*Schizachyrium scoparium*), big bluestem (*Andropogon gerardii*), switchgrass (*Panicum virgatum*), Indian grass (*Sorghastrum nutans*), species of grama (*Bouteloua* spp), and silver bluestem (*Bothriochloa laguroides*).

3.4 VISUAL RESOURCES

The term aesthetics refers to the subjective perception of natural beauty in the landscape and attempts to define and measure the scenic qualities of an area. Consideration of the visual environment includes a determination of aesthetic values where the location of a proposed project could potentially affect the scenic value of an area.

The aesthetic analysis addresses potential visual impacts to the public, specifically impacts on viewsheds or scenic areas that are highly visible. Aesthetic values considered in this analysis include the following:

- Uniqueness of the landscape in relation to the region;
- Consideration if the scenic area is a foreground, middle ground, or background view;
- Focus of the view;
- Scale of elements in the scenic area;
- Number of likely viewers;
- Duration of the view; and
- Amount of previous modifications or disturbance to the scenic area.

The landscapes within the proposed Project Area are not considered unique within the region and represent the typical landscapes associated with the Cross-Timbers region. Based on the relatively large size of the Project Area it would be considered a background view for nearly all observers. The Project Area represents a relatively large, undeveloped, open area within a landscape of similar nature. The number of viewers is expected to be relatively low, as the proposed project is located within relatively rural portions of Johnston and Pontotoc Counties.

The following summary was prepared using the “Diamond Spring Wind Proposed Project – Visual Impact Assessment Report”. For a complete description of visual resources please refer to this report.

A 20-mile radius around the proposed project was established as a visual resources analysis area. Based on the results of a GIS-based visibility analysis and relying on local project staff, consultants, and stakeholders, five viewpoints were selected as representative of viewsheds and receptors within the analysis area (**Table 3-2**).

Table 3-2 Viewpoints Selected for Visual Analysis			
Viewpoint	Location	Approximate Distance to nearest Proposed Turbine (miles)	Comments
1	Jacobs Ranch	1.0	Provides relatively close view of proposed turbines representative of rural residential locations near Project area.
2	Oka’ Yanahli Preserve	5.6	View from west of preserve’s headquarters on Sunset Hill popular with photographers visiting the Nature Conservancy preserve.
3	Chickasaw Retreat and Conference Center	10.3	Provides an elevated view toward the proposed project from a rooftop viewing area.

4	Chickasaw National Recreation Area (CNRA)	8.0	View from Bromide Hill overlook where topography and vegetation do not block views toward the proposed project.
5	Artesian Hotel (rooftop)	7.0	View from area in Sulphur from which proposed project turbines would be visible.

3.5 NOISE

Ambient or background noise levels represent the total amount of noise in an area and are used to compare the effects of a new noise source relative to existing conditions. Ambient noise levels associated with high density urban areas (70 to 80 dBA) are typically much higher than noise levels associated with smaller residential areas (50 dBA). The addition of a new noise source to an area with high existing ambient noise levels may be masked by existing noise sources and therefore less discernable than in an area with low ambient noise levels. In rural areas with low ambient noise levels, a new noise source may be audible at distances farther from the source than a similar source located in an urban setting. Rural settings are likely to have fewer sensitive receptors that would potentially be affected by the noise than in urban settings.

The “Non-Archeological Historic Resources Survey Reports; Diamond Spring Wind Project, Johnston and Pontotoc Counties, Oklahoma” identified about 16 residences within or near the proposed Project Area. These residences represent potential sensitive receptors for potential noise associated with proposed construction activities.

3.6 WATER RESOURCES/WATER QUALITY

The proposed Project Area is within the Lower Washita River and Blue river watersheds (8-digit Hydrologic Unit Codes 11130304 and 11140102, respectively) (EPA 2018). Pennington Creek and Spring Creek drain the majority of the Project Area. Other streams occurring within or draining the Project Area include Little West Blue Creek, Mill Creek, Rock Creek, Threemile Creek, and Reagan Branch.

In Oklahoma, designated beneficial water uses of streams and waterbodies, includes aesthetic, agriculture, fish consumption, warm water aquatic community, navigation, primary body contact recreation, public/private water supply, emergency water supply and secondary body contact. The Federal Clean Water Act (CWA) requires all states to assess surface water quality and list any surface water under Section 303(d) for which beneficial uses are impaired. Pennington Creek is classified by the state of Oklahoma as a High-Quality Water (HQW). Mill Creek, Spring Creek, and Rock Creek are listed on the State of Oklahoma’s 2016 list of impaired waters (EPA 2016).

Floodplains are defined as any land area susceptible to being inundated by waters from any source and are often associated with surface waters and wetlands. FEMA floodplain data is not available for much of the proposed Project Area (FEMA 2018).

3.7 WETLANDS/WATERS OF THE U.S.

Wetlands and waters of the U.S. (WOTUS) were evaluated for the Project Area (Blanton and Associates 2019) and are summarized below.

3.7.1 Applicable Regulatory Programs

Section 404 of the Clean Water Act (CWA) and Section 10 of the Rivers and Harbors Act (RHA) established programs to regulate the discharge of dredged or fill material and other work in the WOTUS, including wetlands and other special aquatic sites. Under Section 404 of the CWA, regulated WOTUS are broadly categorized to include territorial seas, tidal waters, and non-tidal WOTUS, and include all

Section 10 waters, as well as numerous additional inland features such as interstate lakes, rivers, streams, mudflats, sandflats, wetlands, sloughs, prairie potholes, wet meadows, playa lakes, and natural ponds. Section 10 of the RHA regulates work within a subset of these waters, known as “navigable” waters, which are defined in the RHA as those waters that are subject to ebb and flow of the tides and/or are presently used or have been used in the past, or may be susceptible for use to transport interstate or foreign commerce.

Discharges of dredged or fill material may be permanent or temporary. Permanent discharges include those that will permanently affect a WOTUS by filling, flooding, excavation, or drainage. Permanent effects to WOTUS are considered a loss of WOTUS if the discharges change an aquatic area to dry land, increase the bottom elevation of the WOTUS, or change the use of a water body. In addition to losses of physical areas of WOTUS as a result of discharges, the United States Army Corps of Engineers (USACE) regulates the loss of functions or values of WOTUS in some circumstances when permanent discharges are not involved, such as clearing a forested wetland or changing the hydrology of a WOTUS upstream or downstream of a permitted activity.

Discharges of dredged or filled material and other work in waters subject to regulation under Section 404 or Section 10 typically require permit authorization before it occurs, unless the activity is excepted from regulation. Section 404 and Section 10 permits that are commonly issued by the USACE include Standard Individual Permits and General Permits (including Nationwide Permits (NWP) and Regional General Permits).

3.7.2 Identification of Potential WOTUS

The combination of existing data review and field investigations were used to identify and map potential WOTUS, including wetlands that may be affected through implementation of the proposed Project. Survey buffer limits were applied to each proposed infrastructure component:

- 250-foot radius from proposed turbine locations;
- 500-foot wide corridor centered on proposed access roads and electrical collection line alignments, and
- 500-foot wide corridor centered on proposed overhead gen-tie transmission line alignment.

3.7.3 Potential Waters of the U.S. Subject to Section 404 of the Clean Water Act

A total of 333 potential WOTUS were identified and mapped within the proposed Project infrastructure corridors, including 61 ponds, 90 emergent wetlands, 13 forested wetlands, and 169 stream segments (see **Figure 4**).

The majority of ponds were constructed on ephemeral and intermittent drainages. Pond size ranged from less than one acre to approximately 12 acres. Many of the emergent wetlands were found along stream scours or adjacent to streams in the northern half of the Project Area. Thirteen forested wetlands were identified within proposed infrastructure corridors. Perennial streams that were identified included Pennington Creek, tributaries to Pennington Creek, and Rock Creek.

3.8 WILDLIFE

3.8.1 General Wildlife

This section describes those wildlife species that are considered common and are not identified by Federal or state agencies as at risk-species that require special management. General wildlife species discussed here are terrestrial species, as covered activities under the proposed HCP would not occur in

aquatic habitats, and thereby would not directly or indirectly impact species dependent upon aquatic habitats.

The Cross-Timbers biome is expected to support a variety of common wildlife species. Bird species expected to occur in the proposed Project Area represent songbirds, corvids (jays and crows), waterfowl, wading birds, raptors, and others. Common mammal species that may occur in the proposed Project Area include white-tailed deer (*Odocoileus virginianus*), coyote (*Canis latrans*), bobcat (*Lynx rufus*), raccoon (*Procyon lotor*), Virginia opossum (*Didelphis virginiana*), nine-banded armadillo (*Dasypus novemcinctus*), Eastern cottontail rabbit (*Sylvilagus floridanus*), Eastern gray squirrel (*Sciurus carolinensis*), striped skunk (*Mephitis mephitis*), and other small mammals. Reptiles and amphibians that have the potential to occur include a variety of snakes, lizards, frogs, toads, and other species.

The “Crosstimbers Region for the Oklahoma Comprehensive Wildlife Conservation Strategy” includes a list of terrestrial wildlife species that have been described as “species of greatest conservation need” (ODWC 2005). Twenty-one terrestrial species, including 12 bird species, three mammal species, and six reptile species are described as “species of greatest conservation need” in this report. Refer to the report for a full description of the Crosstimbers region and its associated species of greatest conservation need. **Table 3-3** presents the list of these species of greatest concern.

Common Name (Scientific Name)	Status	Trend
Bald Eagle (<i>Haliaeetus leucocephalus</i>)	Low	Increasing
Canvasback (<i>Aythya valisineria</i>)	Low	Unknown
Lesser Scaup (<i>Aythya affinis</i>)	Medium	Declining
Little Blue Heron (<i>Egretta caerulea</i>)	Medium	Unknown
Louisiana Waterthrush (<i>Parkesia motacilla</i>)	Medium	Unknown
Northern Pintail (<i>Anas acuta</i>)	Medium	Declining
Peregrine Falcon (<i>Falco peregrinus</i>)	Low	Unknown
Prothonotary Warbler (<i>Protonotaria citrea</i>)	Medium	Unknown
Sandhill Crane (<i>Grus canadensis</i>)	Medium	Stable
Solitary Sandpiper (<i>Tringa solitaria</i>)	Low	Unknown
Trumpeter Swan (<i>Cygnus buccinators</i>)	Low	Unknown
Whooping Crane (<i>Grus americana</i>)	Low	Increasing
Brazilian (Mexican) Free-tailed Bat (<i>Tadarida brasillensis</i>)	Unknown	Unknown
River Otter (<i>Lontra canadensis</i>)	Medium	Increasing
Seminole Bat (<i>Lasiurus seminolus</i>)	Unknown	Unknown
Eastern River Cooter (<i>Pseudemys concinna concinna</i>)	Unknown	Unknown
Midland Smooth Softshell (<i>Apalone mutica</i>)	Unknown	Unknown
Mississippi Map Turtle (<i>Graptemys pseudogeographica kohni</i>)	Unknown	Unknown
Ouachita Map Turtle (<i>Graptemys ouachitensis</i>)	Unknown	Unknown
Razor-backed Musk Turtle (<i>Sternotherus carinatus</i>)	Unknown	Unknown
Spiny Softshell Turtle (<i>Apalone spinifera</i>)	Unknown	Unknown

The 1988 amendment to the Fish and Wildlife Conservation Act mandates the Service to identify species, subspecies, and populations of all migratory nongame birds that, without additional

conservation actions, are likely to become candidates for listing under the ESA. *Birds of Conservation Concern 2008* (USFWS 2008) is a publication that lists such nongame migratory birds toward carrying out this mandate. In this publication, the proposed Project Area is described as occurring in the Birds of Conservation Region (BCR) 21. **Table 3-4** lists the bird species of conservation concern that have the potential to occur in the proposed Project Area.

Table 3-4	
Birds of Conservation Concern in the Oaks and Prairies Region (BCR 21)	
Common Name	Scientific Name
Little Blue Heron	<i>Egretta caerulea</i>
Swallow-tailed Kite	<i>Elanoides forficatus</i>
Bald Eagle	<i>Haliaeetus leucocephalus</i>
Peregrine Falcon	<i>Falco peregrinus</i>
Black Rail	<i>Laterallus jamaicensis</i>
Upland Sandpiper	<i>Bartramia longicauda</i>
Long-billed Curlew	<i>Numenius americanus</i>
Hudsonian Godwit	<i>Limosa haemastica</i>
Buff-breasted Sandpiper	<i>Tryngites subruficollis</i>
Red-headed Woodpecker	<i>Melanerpes eruthrocephalus</i>
Scissor-tailed Flycatcher	<i>Tyrannus forficatus</i>
Loggerhead Shrike	<i>Lanius ludovicianus</i>
Bell's Vireo	<i>Vireo bellii</i>
Sprague's Pipit	<i>Anthus spragueii</i>
Swainson's Warbler	<i>Limnothlypis swainsonii</i>
Henslow's Sparrow	<i>Ammodramus henslowii</i>
Harris's Sparrow	<i>Zonotrichia querula</i>
Smith's Longspur	<i>Calcarius pictus</i>
Orchard Oriole	<i>Icterus spurius</i>

Source: USFWS 2008

The North American Breeding Bird Survey (BBS) is a long-term, large-scale, international avian monitoring program initiated in 1966 to track the status and trends of North American bird populations. Each year during the height of the avian breeding season, skilled bird surveyors collected bird population data along roadside survey routes. Each survey route is approximately 24.5 miles long with stops every 0.5 mile apart. At each stop, a three-minute point count is completed. Every bird seen or heard within a 0.25-mile radius is recorded. Over 4,100 survey routes are located across the continental U.S. and Canada.

There is a BBS survey route (Mill Creek Route) that crosses the proposed Project Area. Six species of concern, including the little blue heron, red-headed woodpecker, scissor-tailed flycatcher, orchard oriole, loggerhead shrike and Bell's vireo have been observed along this route. Six species designated by the USFWS Birds of Conservation Concern in Bird Conservation Region 21 (Oaks and Prairies) were observed during surveys of the Project Area: long-billed curlew, upland sandpiper, Smith's longspur, loggerhead shrike, bald eagle, and scissor-tailed flycatcher (Diamond Spring Wind, LLC 2019).

3.8.2 Bald Eagle and other Raptors

In February 2019, aerial eagle and raptor nest surveys were completed. Two bald eagle nests exist in habitats associated with the proposed project. One active bald eagle nest is located within the proposed

project boundary and was documented as occupied with eggs in the nest (see Figure 2-3 Final HCP). A second active bald eagle nest is located less than one mile outside the northern boundary of the proposed project and was documented as occupied with an adult and two chicks in the nest (Diamond Spring LLC 2019). In addition, four unoccupied raptor nests were observed within the proposed project boundary. An occupied raptor nest was also observed within one mile of the proposed gen-tie (Diamond Spring LLC 2019).

3.8.3 Threatened and Endangered Species

Covered Species

The ABB is the only covered species in the HCP. The Service announced the federally listing of this species as endangered in 1989 (USFWS 1989). No critical habitat for this species has been designated.

The ABB is a member of the beetle family Silphidae, commonly known as burying or carrion beetles. The subfamily Nicrophorinae is known for their unique traits of burying vertebrate carcasses in support of reproduction and for exhibiting parental care to their young (USFWS 1991). The ABB is nocturnal and is active during the warm summer months. Historically, the ABB was distributed throughout 35 states (USFWS 1991). Currently, distribution is known in nine states including, Rhode Island, Massachusetts, Oklahoma, Arkansas, Nebraska, Kansas, South Dakota, Texas, and Missouri. A detailed description of the life history and management history of the ABB is available in the HCP.

The proposed Plan Area is within the current range of the ABB but is not included within the ABB Conservation Priority Area located in east-central Oklahoma. ABB use a variety of habitats for all aspects of their life cycle. Habitats that are typically unfavorable for the ABB have been described by the USFWS as:

- Land that is tilled on a regular basis, planted in monoculture, and does not contain native vegetation.
- Pasture or grassland that has been maintained through frequent mowing, grazing, or herbicide application at a height of 20 cm (8 inches) or less.
- Land that has already been developed and no longer exhibits surficial topsoil, leaf litter, or vegetation.
- Urban areas with maintained lawns, paved surfaces, or roadways.
- Stockpiled soil without vegetation.
- Wetland with standing water or saturated soils (defined as exhibiting hydric soils, and vegetation typical of saturated soils, and/or wetland hydrology).

Areas of favorable and unfavorable ABB habitat were identified using criteria included in the American Burying Beetle Impact Assessment for Project Reviews (USFWS 2016) and results of habitat modeling completed in 2018 (SEARCH 2018). Favorable and unfavorable ABB habitats in the Project Area are depicted in **Figure 5**.

Late season presence-absence surveys were completed in July and August 2019. The results of these surveys were used to assess ABB occupancy of modeled favorable habitats (SEARCH 2019). During these late season surveys completed in the 2019, ABB were captured in 56 of 70 trapping locations.

Occupied-favorable ABB habitat is defined as areas of modeled favorable habitat within the Plan Area where ABB were caught during late season presence-absence surveys. Unevaluated-favorable ABB

habitat is defined as areas of modeled favorable ABB habitat within the Plan Area that were not surveyed during the late season surveys. Occupied-favorable habitats and unevaluated-favorable habitats form the basis for determining ABB take. Maps of the various ABB habitat designations are included in the final HCP.

Noncovered species

There are five other federally-listed species that have the potential to occur in Johnston or Pontotoc Counties, Oklahoma. These species include the interior least tern (*Sterna antillarum*), piping plover (*Charadrius melodus*), red knot (*Calidris canutus rufa*), whooping crane (*Grus americana*), and Arkansas River shiner (*Notropis girardi*). As described in the HCP, the Applicant and Service reviewed this list of species and discussed the potential for the proposed project to impact these species. Following this review, it was agreed that the proposed project would not likely adversely affect these species, no site-specific studies would be necessary, and no permits would be recommended. **Table 3-5** includes a list of these species, a description of their habitats, and rationale for excluding them from further analysis.

Table 3-5 Federally-Listed Species Considered for Analysis			
Common Name	Scientific Name	Habitat	Rationale
Interior Least Tern	<i>Sterna antillarum</i>	Riverbanks, sandbars, and salt flats.	No suitable habitat exists in the project area. Unlikely to occur.
Piping Plover	<i>Charadrius melodus</i>	Mudflats, sandy beaches, and shallow wetlands.	Shallow wetlands are present in the project area. Other suitable habitats are not present. Unlikely to occur.
Red Knot	<i>Calidris canutus rufa</i>	Mudflats	Suitable habitats do not exist in the project area. Unlikely to occur.
Whooping Crane	<i>Grus americana</i>	Shallow wetlands, shorelines and margins of water bodies, wet prairies, and wetlands within row crops.	Proposed project area is outside the area where 95 percent of whooping cranes are observed during their annual migration. There are no historical sightings within or near the proposed project area. Unlikely to occur.
Arkansas River Shiner	<i>Notropis girardi</i>	Designated Critical Habitat for this species is located in the Canadian River. The Canadian River forms the northern boundary of Pontotoc County, which is more than 20 miles north of the proposed project area.	Does not occur in the project area.

4.0 ENVIRONMENTAL CONSEQUENCES

NEPA requires that agencies include in their EAs a detailed statement of, among other things, the environmental impact of the proposed action and a description of unavoidable, adverse, environmental effects should the proposed action be implemented (42 USC 4332). NEPA regulations identify three types of effects: direct, indirect, and cumulative (40 CFR 1508.8). Direct effects are “caused by the action and occur at the same time and place.” Indirect effects are “caused by the action and are later in time or farther removed in distance, but are still reasonably foreseeable [and] may include growth inducing effects and other effects related to induced changes in the pattern of land use, population density or growth rate, and related effects on air and water and other natural systems, including ecosystems” (40 CFR 1508.8). Cumulative effects are those resulting from “the incremental environmental impact of the action when added to other past, present, and reasonably foreseeable future actions, regardless of what agency (Federal or non-Federal) or person undertakes such other actions” (40 CFR 1508.7).

Use in NEPA requires consideration of both context and intensity (40 CFR 1508.27), where context is defined as the significance of an action in its current and proposed short-and long-term effects on the whole of a given resource (e.g.-affected region). Intensity refers to the severity of the effect.

4.1 PROPOSED ALTERNATIVE

4.1.1 Cultural Resources

Compliance with Section 106 of the National Historic Preservation Act (NHPA), as amended, is required by law for all Federal undertakings. This includes issuance of Section 10(a)(1)(B) incidental take permits for activities covered in an HCP. Notifications were sent to the Chickasaw Nation, State Historic Preservation Office, and the Oklahoma Archeological Society.

Cultural resource evaluations did not reveal any significant cultural materials or archeological sites that warranted inclusion in the NHRP within the proposed Plan Area (Blanton & Associates 2018). However, it is possible that unidentified cultural resources could be impacted during implementation of the Covered Activities, particularly during soil disturbing activities.

The Service received a letter from the Oklahoma Archeological Survey, dated September 24, 2019. By this letter, the Oklahoma Archeological Survey tentatively concurred with the overall project effects dependent on receiving additional stipulations for protections of potential burial sites located within the Plan Area and resubmission of two site forms in proper format. Diamond Spring Wind, LLC has committed to implement specific measures during project construction to avoid impacts to potential burial sites within the Plan Area.

The Service received a letter from the Oklahoma State Historic Preservation Office, dated September 18, 2019. By this letter, the Oklahoma State Historic Preservation Office requested larger formatted maps, submission of some additional information, and protection plan of potential burial sites located within the Plan Area. Diamond Spring Wind, LLC has committed to address these comments and to implement specific measures during project construction to avoid impacts to potential burial sites within the Plan Area.

With implementation of the avoidance and minimization committed to by Diamond Spring Wind, LLC, implementation of the Covered Activities will not result in short term or long term adverse effects to cultural resources.

4.1.2 Geology/Soils

Implementation of Covered Activities can affect soils through surface disturbing activities, soil erosion, and storm water runoff. Short-term effects would be temporary and would be reclaimed and revegetated in ABB habitat after construction is complete. Long-term effects associated with features of the project would persist for the life of the project, including structures, surface facilities, and access roads. **Table 4-1** summarizes the temporary and permanent impacts by project component.

Table 4-1 Estimated Temporary and Permanent Impacts to Favorable and Unfavorable ABB Habitats			
Ground Disturbing Construction Activities	Occupied-Favorable Unevaluated – Favorable Habitat (acres)	Unfavorable Habitat (acres)	Subtotal (acres)
Permanent Impacts	47.64	44.79	92.43
T-Line Poles	0.01	0.0	0.01
Met Tower	0.07	0.03	0.1
O&M	0.0	5.0	5.0
Access Roads	45.33	33.43	78.76
Substation	0.0	5.0	5.0
Turbines	2.24	1.32	3.56
Temporary Impacts	521.1	316.89	837.99
Collection Lines	148.6	93.46	242.06
Gen-tie Access Roads	9.5	3.68	13.18
Gen-tie Structure Assembly Area	9.5	3.68	13.18
Laydown Yards	0	15	15
Met Tower	0.18	0	0.18
Access Roads	60.55	43.9	104.45
Turbines	130.69	78.4	209.09
Crane Paths	137.18	68.01	205.19
Grand Total (acres)	568.74	361.68	930.42

Source: Table 3 Final HCP (8-23-19)

Surface disturbing activities include vegetation removal, grading, excavation, and soil stockpiling, most of which would result in temporary short term impacts (Table 4-1). These activities can result in loosening of soils which can make them more susceptible to wind and water erosion; compacting soils that could reduce water infiltration capacity and increase runoff; or displacing soils that can result in altered surface runoff patterns.

Soil erosion can be caused by wind and water. Erosion can result in the loss of productive soil and can cause degradation of water quality and air quality. Several Avoidance and Minimization Measures (AMMs) are included in the HCP that minimize the effects related to soil erosion, including stormwater

Best Management Practices (BMPs), limiting clearing in temporary work areas, limiting use of motor vehicles, machinery, or heavy equipment, relieving soil compaction, and revegetation for temporary habitat impacts. These AMMs are described in detail in the HCP. To mitigate potential impacts on soils, compacted soils in ABB-occupied habitat would be mechanically broken up (disked) to a depth of 24 inches in temporary work areas, laydown areas, and other heavily used or traveled areas. This would relieve soil compaction and promote revegetation, which would improve suitability for the ABB.

Stormwater runoff can be caused by surface disturbing activities and may result in alteration of surface drainage patterns, concentration of surface flows, increase in surface flow volumes and velocities. These effects can result in soil erosion. The AMMs listed above, and described in the HCP, would minimize stormwater runoff.

Implementation of the Proposed Alternative would impact an estimated 210 acres of soils considered prime farmland in the Plan Area. Prime farmland, as defined by the U.S. Department of Agriculture, is land that has the best combination of physical and chemical characteristics for producing food, feed, forage, fiber, and oilseed crops and is available for these uses. It could be cultivated land, pastureland, forestland, or other land, but it is not urban or built-up land or water areas. Covered Activities would result in an estimated 177 acres of temporary impacts and 33 acres of permanent impacts to prime farmland. Temporary impacts would be short term, because of the AMMs listed above would aid in soil stability. The long-term impacts on soil would be low, because permanent impacts would impact 33 acres, and the surrounding soil structure would likely function as normal, prime farmland soils do.

4.1.3 Vegetation

Implementation of several Covered Activities would have an impact on vegetation within the proposed Plan Area, including construction of new transmission lines, substations, access roads, and other facilities and work areas. Impacts to vegetation would include disturbance and removal, and plant growth could be affected by soil compaction, establishment and spread of invasive plant species, and the deposition of fugitive dust.

New construction activities would temporarily disturb or permanently remove an estimated 930 acres of vegetation in discrete areas associated with proposed facilities, including buildings, turbine sites, access roads, utility corridors and other work areas. Post-construction reclamation, a Covered Activity, includes several actions that would reduce the impacts of vegetation disturbance and removal. In addition, the HCP includes AMMs that would limit the clearing of vegetation in temporary work areas; limit use of vehicles and machinery to areas directly related to Covered Activities and limit off-road use; and revegetate temporary habitat impacts.

Soil compaction has the potential to impact existing vegetation and revegetation efforts. Impacts associated with soil compaction would be minimized with the successful implementation of several HCP AMMs that pertain to limiting off-road travel, soil ripping prior to revegetation, and others. It is possible that invasive species currently occur within the existing vegetation community in the proposed Project Area. As described in the HCP, if during the permit term, noxious or invasive weeds should occur in areas that have been temporarily impacted by Covered Activities, the project proponent will work with the USFWS to develop and implement invasive species control measures that are compatible with landowner requirements. Such measures might include modification of methods used for vegetation management or control of invasive species through mechanical, biological, and targeted application of acceptable herbicides. It is possible that the generation and deposition of fugitive dust could affect plant growth by inhibiting photosynthesis and reducing vegetation density and plant diversity. However, based on the scale, short-term, and relatively localized nature of the Covered Activities, such impacts

are expected to be negligible to the overall changes in the local plant community composition or health. Implementation of the Covered Activities would result in temporary and permanent impacts to the landcover types that exist within the proposed Plan Area. **Table 4-2** presents the acres of temporary and permanent disturbance by landcover type. Short-term impacts to vegetation would be minimized and the area would be restored per the AMMs mentioned above. Though some vegetation would be permanently lost to wind energy infrastructure, the long-term ecosystem functions of the local plant community would be expected to remain intact and effective.

Table 4-2 Acres of Disturbance by Landcover Type in the Proposed Plan Area			
Landcover Type	Temporary (acres)	Permanent (acres)	Total Acres
Occupied Favorable and Unevaluated Favorable			
Deciduous Forest	55.65	3.42	59.07
Grassland/Herbaceous	451.35	42.96	494.31
Pasture/Hay	11.36	1.05	12.41
Developed, Open Space	2.74	0.21	2.95
Total Favorable	521.10	47.64	568.74
Unfavorable			
Open Water	0.36	0.0	0.36
Deciduous Forest	11.58	0.64	12.22
Grassland/Herbaceous	151.49	24.67	176.16
Pasture/Hay	141.24	17.05	158.29
Developed/Open Space	12.22	2.42	14.64
Developed, High Intensity	0.2	0.0	0.2
Total Unfavorable	316.89	44.78	361.67
Total (acres)	837.99	92.43	930.42

Source: Table 2 Final HCP (8-23-19)

4.1.4 Visual Resources

Covered Activities that have potential to affect visual resources include the construction of new overhead transmission lines, wind turbines, met towers, electric substations, and access roads. These actions could result in vegetation removal or modification; surface disturbance; and increased human presence, such as additional vehicle or equipment use and nighttime lighting, all of which impact visual resources and aesthetics.

Turbines would be the most visible components of the proposed project. The visibility of the turbines would be influenced by factors including distance, topography, vegetation, and buildings that may block or screen views of the turbines. Based on an evaluation of potential turbine visibility from the five established viewpoints, the following characterizations can be made for turbine visibility within three zones, foreground (0 -2 miles), middleground (2 – 5 miles); and background (greater than 5 miles).

Within the foreground zone, turbines would likely dominate views toward the proposed project site. Turbines would likely contrast with the existing character of views near them and could lower visual quality. Visual quality of views with higher visual quality rankings would likely be lowered to some degree if the turbines dominate the view.

Within the middleground zone, the lower portions of proposed turbine towers would likely be blocked from view by topography and vegetation. When visible, the turbines would not dominate views, but because of their form and color the turbines would be visible. Visual quality rankings within this zone could be lowered based on the visibility of turbines.

Within the background zone, topography and vegetation would further impede views of the proposed turbines. Under the optimal conditions, including atmospheric and lighting conditions, the proposed turbines would likely be visible based on their contrast and movement. Compared to other visibility zones, the proposed turbines when viewed at distances more than five miles would be less likely to contrast with the existing landscape character or change the visual quality of the view.

The Federal Aviation Administration requires installation of FAA-approved lighting to minimize aviation risks. Within the foreground zone (0 – 2 miles) blinking turbine lights would be visible and noticeable, but they would not dominate nighttime views. In the middleground zone (2 – 5 miles), turbine lights would be noticeable and multiple blinking turbine lights visible within this zone would change the existing nighttime view to some degree, but less than within the foreground zone. Within the background zone (greater than 5 miles), local topography and vegetation would likely obscure the view of some turbine blinking lights. From elevated viewpoints, such as Viewpoints 3, 4, and 5, the presence of other light sources would be visible and would potentially diminish the noticeability and distinctness of the turbine blinking lights.

Short-term Impacts would begin with construction during the initial introduction of equipment and persist long-term within line-of-sight areas. The intensity of visual impacts from these short- to long-term actions would be localized, but severe because the proposed action is the first of its kind within Johnston and Pontotoc Counties, and the current condition of the area impacted influences the magnitude of visual impacts changes.

4.1.5 Noise

The Federal Highway Administration (FHWA) published noise levels associated with common construction equipment (FHA 2006). **Table 4-3** summarizes noise levels associated with operation of common construction equipment that may be used during implementation of the Covered Activities.

Table 4-3	
Maximum Noise Levels at 50 Feet for Common Construction Equipment	
Construction Equipment	Maximum Noise Level at 50 feet (dBA)
Compactor (soil)	80
Crane	85
Dozer	85
Dump Truck	84
Excavator	85
Generator	82
Grader	85
Pickup Truck	55

Source: Federal Highway Administration 2006.

Implementation of the Covered Activities would result in a temporary and short-term increase in the noise levels within and near the proposed Project Area. While such an increase may be above the ambient noise levels associated with a rural setting, there are relatively few receptors in the area that may be impacted. At least 16 residences are known to exist within and near the proposed Project Area.

Occupants of these residences may detect an increase in ambient noise levels. These increases would typically be limited to day-time hours and would cease after construction is complete. Noise impacts are expected to be temporary, and low. Long-term impacts of the operations, which are not covered in the HCP, are lower than construction noise levels.

Wind turbines can result in bird and bat mortalities, which could create sources of carrion that in turn could attract ABBs to wind turbine sites. Rotating wind turbines are known to produce substrate-borne vibrations (seismic) and little is known regarding the potential effects these vibrations may have on the ABB and other wildlife species. One study (Yares et al. 2014) evaluated the effects of vibrations produced by rotating wind-turbines on necrophilous insects. This study found that wind-turbine induced seismic vibrations did not prevent the ABB from breeding on carrion sources and that breeding success is not influenced by vibrations created by wind turbines. The study did report a delay in carcass burial but that this delay did not result in negative impacts to reproductive success. It is possible that the delay in carcass burial indicates that vibrational noise could interfere with communication and potentially alter cooperative behavior in subsoil breeding insects, including the ABB. While this study indicated rotating turbines could cause ABB to delay carcass burial, it is unknown whether or not this would impact ABB breeding or fertility. As described in the final HCP, Yares et al. (2014) and the papers cited in their report did not evaluate ground-borne vibration that may be caused by operating wind turbines but evaluated noise-induced structural vibration, which is not propagated through the ground. Therefore, the vibration levels reported in Yares et al (2014) would not be directly relevant to vibration levels expected in soils around wind projects that could potentially affect ABB.

The project proponent hired professional acousticians to model ground-borne vibration around a wind turbine using conservative assumptions about the type of wind turbine to be installed and operated at the Project. The modeling analysis concluded that ground-borne vibration around operating turbines attenuates to levels below 53dB within 36 feet of the turbine base. This vibration level is approximately 30 dB below the experimental range that Yares et al (2014) indicated could affect ABB behavior. Based on this analysis, it appears unlikely that ground-borne vibrations associated with operation of the proposed wind turbines would impact ABB behavior or reproduction.

4.1.6 Water Resources/Water Quality

Implementation of the Covered Activities would not directly impact surface waters, as these activities would occur in terrestrial habitats, which do not include surface water features.

As described briefly in the Soils Section, surface disturbing activities can result in the mobilization of soils, particularly in overland runoff, that have the potential to enter adjacent or nearby surface waters. Sediment deposition into surface waters can affect water quality by increasing turbidity, which can directly affect aquatic species and their habitats. Turbidity can decrease light penetration and increase pollutant and nutrient levels, which can lead to decreases in water quality. The HCP includes a stormwater management plan as an AMM that would minimize impacts to water resources. Successful implementation of this AMM would minimize impacts to local surface waters and water quality.

Floodplains and associated functions may be impacted by Covered Activities, including vegetation clearing, excavation, and placement of fill or structures in floodplains. Removal of vegetation within a floodplain could cause increases in downstream flood flows, sedimentation, channel erosion, and flooding. Adding fill or structures to floodplains can have effects both downstream and upstream. Downstream effects from reduced flood storage or capacity can include greater volumes of floodwater and increases in floodwater levels. Upstream effects can include increases in floodwater elevations, which can cause flooding upstream.

The HCP includes several AMMs that would minimize vegetation removal and surface disturbing activities thereby reducing the potential for impacts associated with floodplain capacity and flow rates. The HCP also includes AMMs that pertain to relief of soil compaction and revegetation of temporary habitat impacts that would also work to minimize potential effects to floodplains.

4.1.7 Wetlands/Waters of the U.S.

Mapped wetland habitats in the proposed Project Area are typically associated with small impoundments and intermittent drainages, areas that are not associated with proposed turbine sites, access roads, utility structures, and buildings. As such, direct impacts to wetland habitats in the proposed Plan Area would not be expected. Based on the discrete boundaries and size of the proposed disturbance, indirect impacts to wetlands, including changes in hydrology would not be expected. The HCP includes several AMMs that when successfully implemented would reduce impacts to wetlands including limiting disturbance from mechanical vegetation removal; limiting use of vehicles and construction equipment to areas directly associated with proposed facilities; and revegetation of temporary disturbance areas. Based on the avoidance of direct impacts to these resources and the successful implementation of the AMMs, impacts are characterized as temporary and short-term in nature and of relatively low intensity or severity.

As described in Chapter 3, ponds, emergent wetlands, forested wetlands, and perennial streams were identified within the proposed Plan Area. The following sections briefly summarize potential impacts to these wetlands and potential waters of the U.S, as reported in the report titled “Waters of the U.S. Delineation, Diamond Spring Wind Project” (Blanton & Associates 2018c).

It is assumed that project-related impacts to jurisdictional wetlands and waters of the U.S. would be authorized under the Nationwide Permit (NWP) program. The likely NWPs used would be Nationwide Permit 51 – Land Based Renewable Energy Generation Facilities, Nationwide Permit 12 – Utility Line Activities, and/or Nationwide Permit 14 – Linear Transportation Projects (roads).

Ponds

Implementation of the proposed Covered Activities would result in temporary and permanent impacts to 21 ponds, as the result of 24 separate infrastructure crossings. Proposed infrastructure crossings include 12 underground electrical collection line crossings, seven access road crossings, four transmission line crossings, and one pond adjacent to the proposed O&M building. The underground electrical collection line crossings would not result in a loss of Waters of the U.S. because the trenches at each crossing would be backfilled and restored to pre-construction contours. The access road crossings would result in impacts to Waters of the U.S. ranging between less than 0.01 acres to 0.02 acres at each crossing. The transmission line would span ponds, thereby resulting in no temporary or permanent impacts to Waters of the U.S. The siting of the proposed O&M building would be expected to avoid the pond known to exist near the proposed building location.

Emergent Wetlands

Implementation of the proposed Covered Activities would result in temporary and permanent impacts to 28 emergent wetlands, based on 33 separate infrastructure crossings. Emergent wetlands would be crossed by 18 underground electrical collection lines three transmission lines, and 12 access roads. The underground electrical collection lines would result in temporary impacts to emergent wetlands but would not result in permanent losses. The transmission line crossings would span the emergent

wetlands, thereby avoiding impacts. Permanent wetland loss as the result of access road crossing would not exceed 0.01 acres for any emergent wetland.

Forested Wetlands

Implementation of the proposed Covered Activities would result in impacts to six palustrine forested wetlands. Proposed infrastructure crossings associated with palustrine forested wetlands include four underground electrical collection lines, three access roads, and two transmission line crossings. The three access road crossings at W-34, W-35, and W-48 would result in permanent impacts to forested wetlands. Construction of the access road at W-34 would result in 0.12 acres of temporary impacts and 0.05 acres of permanent impacts. At access road crossing W-35 there would be 0.01 acres of temporary impacts and 0.01 acres of permanent impacts. At access road crossing W-48 there would be 0.24 acres of temporary impacts and 0.1 acres of permanent impacts. Construction of the underground electrical collection would not result in permanent impacts to the forested wetland.

Perennial Streams

Implementation of the proposed Covered Activities would cross Pennington Creek at three locations, perennial tributaries of Pennington Creek at two locations, and Rock Creek at one location. Proposed crossings of Pennington Creek include one underground electrical collection lines crossing, one access road crossing, and one transmission line crossing. The proposed underground electrical collection line crossing would be bored beneath Pennington Creek, thereby avoiding impacts to Waters of the U.S. The proposed access road crossing of Pennington Creek would use existing roadways and would not require new construction; and thereby would not result in impacts to Waters of the U.S. The proposed transmission line crossing of Pennington Creek would be a span and would not include discharge of dredged or fill materials to Waters of the U.S.

Two perennial tributaries of Pennington Creek would be crossed by two underground electrical collection lines and two proposed access roads. The two underground electrical collection line crossings of the Pennington Creek tributaries would not result in a permanent loss of Waters of the U.S. The access road crossings would result in a permanent loss of 0.01 acres at each crossing.

Implementation of the proposed covered activities would include crossing of Rock Creek by the proposed transmission line. The transmission line would span Rock Creek at this crossing, resulting in no loss of Waters of the U.S.

Sixty-four intermittent or ephemeral stream segments would be crossed at 77 proposed infrastructure sites. Proposed infrastructure associated with these stream crossings, include 26 underground electrical collection lines, 19 access roads, 31 transmission line crossings, and one crossing at the proposed substation site. Underground electrical collection line crossings and transmission line crossings would not result in a permanent loss of Waters of the U.S. The proposed access road crossings would result in impacts ranging from less than 0.01 acre to 0.03 acres per crossing. Construction of the proposed substation would result in less than 0.01 acres of fill to the stream located near this site (S-35a).

Proposed underground crossings and overhead transmission line crossing would not be expected to impact Pennington Creek, its tributaries, or other water courses. Construction of access road crossings has the potential to cause temporary impacts to water courses based on the likelihood of soil disturbing activities within or near these waters. Possible impacts include changes in water turbidity and waterflow. Impacts would be limited to the duration of the proposed construction of each crossing and the magnitude of these potential impacts would be diminished through the effective implementation of typical construction and mitigation practices, including silt fencing, sedimentation controls, and others.

4.1.8 Wildlife

General Wildlife

Implementation of the Covered Activities have the potential to impact general wildlife species by removing or degrading habitat, human disturbance, entrapment or physical contact with vehicles or machinery, collisions with transmission poles or electrical lines, and fire. The area surrounding the Project Area is contiguous, high quality habitat in Oklahoma. The proposed action could fragment habitat in the area for wildlife.

Implementation of Covered Activities would result in disturbance and/or removal of habitats that support general wildlife species. Disturbance or removal of general wildlife habitats can displace individuals. In cases when similar unaffected habitats are not available, displacement has the potential to impact individual health and survivorship. The habitats that would be impacted by the Covered Activities are common and occur throughout the project area and nearby. As such, alteration and the limited loss of wildlife habitats is expected to include impacts that are largely short-term, related to temporary habitat alteration with a smaller subset of impacts associated with permanent facilities and structures would be characterized as long-term. Both short-term and long-term impacts would be characterized as low level impacts as there is similar and available habitats within the Project Area and the surrounding areas to support general wildlife species.

Implementation of the Covered Activities would represent an increase in human activity in the area. Increased human activity, including human presence and generated noise, can cause disturbance to normal wildlife activities and behaviors. Such disturbances, particularly for nesting birds, may cause adult birds to alter their nest/egg tending activities which can lead to nest failure. Raptors are known to be sensitive to human disturbance during the nesting season. Some grassland birds may avoid or not nest near vertical structures. Displacement and disturbance impacts associated with increases in human activity during project implementation are characterized as short-term and of low intensity.

Through implementation of Covered Activities, including use of vehicles and machinery, wildlife can be injured or killed from collisions with vehicles and machinery and possibly entrapment during soil disturbing activities. Birds may also be injured or killed as the result of collisions or electrocutions when striking above-ground transmission lines and support structures, including turbines. Injury and mortality impacts are characterized as short-term and limited to the life of the proposed construction project and are unlikely to be at the level where local populations are detrimentally impacted.

Human activities, including those proposed in the HCP, have the potential to cause a wildfire when vehicles, heavy equipment, and construction activities occur in vegetated habitats. While normal and standard practices would be implemented to safeguard against starting a wildfire, the risk of starting a wildfire increases during drier periods and within dry habitats. Wildfire is an obvious risk to wildlife based on the potential for injury and mortality for individuals unable to flee the area and because of the impacts on habitats that wildlife use for shelter, breeding, and foraging. Based on successful implementation of project-related AMMs, and other standard practices, the risk of wildfire would be minimized and characterized as low.

Short-term impacts to wildlife may include injury or mortality, disturbance, and displacement resulting from proposed construction activities, but the AMMs that have been described would likely minimize the intensity of these short-term impacts. For example, songbirds that typically nest within the Project Area may abandon nests as the result of proposed construction activities. However, after completion of the proposed construction activities, nesting would be expected to resume in areas associated with the proposed project. Therefore, the long-term effects to other wildlife would be low.

Bald Eagle and other Raptors

Implementation of proposed covered activities has the potential to impact bald eagles. Potential direct impacts resulting from implementation of various construction activities and increased human presence include short- and long-term disturbance to the active nest in the center of the Project Area and the active nest located just outside the Project Area boundary and displacement of individual eagles that could cause direct take of adults and fledglings. Direct take of adult and immature eagles could also occur as a result of collision with wind turbines. Even with the implementation of several eagle-specific conservation measures, the risk of mortality to the bald eagle as a result of project construction and operation is believed to be moderate to high.

The project proponent has committed to implement several measures toward avoiding and minimizing impacts to bald eagles, including:

1. Turbines will be set back from existing bald eagle nests within the Project boundary to avoid and minimize disturbance and operational impacts;
2. A carrion removal program will be implemented to reduce attraction of bald eagles and other raptors to the Project area;
3. Other standard best management practices identified in the Land-based Wind Energy Guidelines (USFWS 2012) will be followed;
4. Maintain a buffer of at least 660 feet (200 meters) between all construction activities and eagle nests (including active and inactive nests);
5. Restrict all clearing, external construction, and landscaping activities within 660 feet of a nest to outside the nesting season (August through mid-January); and
6. Maintain any established landscape buffers.

Given the potential for bald eagle populations to expand in the vicinity of the Project Area over the life of the proposed project, the project proponent will work in good faith with the USFWS to diligently pursue and obtain an Eagle Take Permit (ETP) that will authorize potential incidental take of bald eagles that might occur during project operations. The proponent will develop and submit an application for a long-term ETP for project operations after ETP issuance in accordance with applicable agency regulations and policies.

According to the Eagle Conservation Plan Guidance, the proposed alternative would be a Category 2 (High to Moderate risk) to eagles. The project would not be a Category 1 (High risk) because there are AMMs in place to reduce risk to eagles in the short-term. However, unless the applicant seeks and receives an ETP, the long-term effect to eagles would be adverse because take would be likely to occur.

Threatened and Endangered Species

Covered Species

Implementation of the Covered Activities has the potential to result in impacts to the ABB, the only covered species in the HCP. Impacts to the ABB may be caused by habitat alteration and removal, injury and mortality caused by vehicles or construction equipment, artificial lighting, predation, food availability, and fire. Of these potential sources of impact, habitat alteration and removal is expected to result in the majority of ABB take in the form of direct mortality and habitat loss.

Implementation of Covered Activities can cause ABB habitat degradation by disturbing the soil, altering soil moisture, and eroding the soil. Physical disturbance and movement of soils during construction, including vegetation clearing, soil grading, and excavating, can injure or crush individual ABB. Soil disturbing activities have a high potential for impacting ABB based on their life cycle that requires individuals to remain buried in the soil for long periods of time.

American Burying Beetles are known to be sensitive to changes in soil moisture and high soil temperatures (Bedick et al. 2006). Clearing of vegetation and grading of construction areas can lead to a decrease in soil moisture and an increase in soil temperatures. Compaction of soils can decrease moisture content and therefore is another mechanism that can cause impacts to the ABB. The HCP includes AMMs that would minimize the effects related to changes in soil moisture and temperature, including limit clearing in temporary work areas; limit use of motor vehicles, machinery, and heavy equipment; relief of soil compaction; and revegetation for temporary habitat impacts.

Removal of vegetation and soil disturbing activities can increase the potential for soil erosion. Erosion can be detrimental to ABB because deposition of eroded soils can accumulate to depths that exceed the ability of subterranean ABB adults or broods to emerge. Erosion may also cause the loss of soils in areas where ABB occur, thereby exposing them to deleterious conditions, including insufficient soil moisture and elevated soil temperatures. As discussed in the Geology/Soils section, the HCP includes management practices and AMMs, including erosion control measures where appropriate, and the re-establishment of vegetation in areas impacted by the Covered Activities. Implementation of these and other practices would minimize the potential for erosion and thereby diminish the potential and magnitude of erosion related effects to the ABB.

American Burying Beetles may be injured or killed as the result of human activity in occupied ABB habitats. American Burying Beetles may be harmed by trampling of feet and crushing by vehicle tires and implements. Alteration of undisturbed habitats caused by the construction of roads and powerlines may lead to indirect effects to the ABB related to habitat fragmentation. Direct impacts on the ABB would be minimized by implementing several AMMs that are included in the HCP including limiting off-road travel and activities, limiting the clearing of temporary work areas, and employee training.

Artificial light sources that occur during the ABB active season have the potential to attract ABB, which could lead to take caused by human activity, vehicles, construction equipment, or cause changes in health or reproductive status if attracted to unfavorable habitats. ABBs attracted to or disoriented by artificial light could also become more susceptible to predation. Included in the HCP is an AMM that pertains to the limited use of artificial lighting in occupied favorable habitats. Construction requiring artificial lighting will be minimized when within occupied favorable habitats or within unevaluated favorable habitats when nighttime construction is necessary. Also, direct light would be shielded to the work areas preventing light from projecting upwards, thus minimizing the potential to attract ABB and other insects.

Implementation of the Covered Activities may increase ABB predation rates. Newly created edge habitats associated with areas where vegetation and/or soils have been disturbed or removed could lead to increased ABB predation. The introduction or spread of pests, particularly the red imported fire ant, would also lead to increased ABB predation.

Implementation of the Covered Activities has the potential to increase the occurrence and numbers of other animal scavenger species that also rely on carrion. By increasing competition for appropriately sized prey carrion, ABB could experience physiological stresses and could potentially be displaced as the result of a change in the availability of appropriate prey species carrion. Additionally, reductions in the

availability of suitable carrion could reduce reproductive opportunities and success for individual beetles.

Human activities, including those proposed in the HCP, have the potential to cause a wildfire when vehicles, heavy equipment, and construction activities occur in vegetated habitats. While normal and standard practices would be implemented to safeguard against starting a wildfire, the risk of starting a wildfire increases during drier periods and within dry habitats. Wildfire is an obvious risk to ABB by causing direct harm to individuals and indirectly by altering vegetation communities, soil characteristics, and carrion prey species availability.

Estimated Take

The HCP quantifies the amount of take from Covered Activities by using temporary and permanent impacts to occupied-favorable and unevaluated-favorable ABB habitat as the surrogate for impacts on the species. This approach is justified because it is difficult and impractical to count or estimate the number of ABBs that would be taken by the Applicant's actions. Incidental take of ABBs is difficult to quantify because 1) individuals are relatively small and mostly nocturnal, making the discovery of dead or injured beetles unlikely; 2) ABB mortalities may be undetectable during normal fluctuations in the population; and 3) a substantial portion of the ABB lifecycle occurs underground. This approach is consistent with the American Burying Beetle Impact Assessment for Project Reviews (USFWS 2016).

Table 4-4 summarizes the acres of temporary and permanent disturbance within occupied-favorable and unevaluated-favorable ABB habitats.

Table 4-4 Estimated Take Based on Proposed Disturbance to Occupied and Unevaluated Favorable ABB Habitats*			
Occupied Favorable and Unevaluated Favorable by Habitat Type	Temporary Disturbance (acres)	Permanent Disturbance (acres)	Total Disturbance (acres)
Deciduous Forest	55.65	3.42	59.07
Grassland/Herbaceous	451.35	42.96	494.31
Pasture/Hay	11.36	1.05	12.41
Developed, Open Space	2.74	0.21	2.95
Total (acres)	521.1	47.64	568.74

* Source: Table 2, Final HCP (8-23-19)

Take of ABBs and impacts to ABB habitats are not anticipated to negatively affect the population locally or throughout its range, or to result in an adverse effect on the long-term conservation of the species. Avoidance and minimization measures are designed to reduce direct take from mortality. For unavoidable impacts to ABB habitats, the mitigation included in the HCP would offset impacts through protection, enhancement, and management in perpetuity of habitat for the ABB according to mitigation ratios established by the Service that are designed to offset the impact of unavoidable incidental take. The mitigation measures are anticipated to offset effects to individual ABB and ABB habitat.

4.2 NO ACTION ALTERNATIVE

Under the No Action Alternative, the Service would not issue the ITP. As such, the Applicant would not be authorized take for the ABB

4.3 CUMULATIVE IMPACTS

Cumulative effects are those resulting from “the incremental environmental impact of the action when added to other past, present, and reasonably foreseeable future actions, regardless of what agency (Federal or non-Federal) or person undertakes such other actions” (40 CFR 1508.7).

4.3.1 Past and Present Actions in the Permit Area

The proposed Permit Area is relatively small compared to the overall range of the ABB. Portions of the ABB range have undergone extensive development and alteration, while others are less impacted. Major developments throughout the range of the ABB have included conversion of native habitats to agricultural or grazing lands, urban and rural development, energy generation and transmission projects, and transportation projects. Within the proposed Permit Area and nearby, there are no known proposed projects related to large land development, energy generation and transmission, and transportation.

At the county scale, there are several proposed and ongoing transmission line and pipeline projects that may represent cumulative impacts to the ABB and other human and environmental resources. Some transmission line projects occurring within Johnston or Pontotoc Counties include Seminole to Tuskegee, McAlester to Atoka, Maud to Weleetka, Atoka to Hugo, and Hugo to Fort Towson to Valliant. Two natural gas or oil pipeline projects known to exist within Johnston or Pontotoc Counties include the Midship pipeline and the Seaway Twinning pipeline. As federal projects, potential impacts from these projects would be or have been analyzed under NEPA and if potential to impact the ABB or other federally-listed species existed, a Biological Opinion (BO) would have been issued. These projects would have established measures to minimize impacts to the ABB, conservation measures, and mitigation requirements.

The Service approved the Oil and Gas Industry Conservation Plan (ICP) that addresses impacts of oil and gas activity in 45 counties in Oklahoma, including Pontotoc County. Actions covered under the ICP may result in take of the ABB associated with several activities, including but not limited to, exploration, development, extraction, and distribution of crude oil, natural gas, and other petroleum products. Since 2014, when the Service originally approved the ICP, the Service has re-issued less take than anticipated based on reductions in industry activity. As of December 2018, the Service has approved impacts to 5,255 acres of ABB habitat.

4.3.2 Reasonably Foreseeable Future Actions within the Plan Area

Reasonably foreseeable future actions in vicinity of the proposed project are likely limited to oil and gas pipeline projects and wind energy projects. U.S. Census Bureau data (2018) indicates relatively low or negative population growth for Johnston and Pontotoc Counties. As such, urban growth and development is not expected to be a substantial source of impacts to the ABB or other human or natural resources in the Plan Area.

4.3.3 Evaluation of Cumulative Effects

Vegetation

Past and present actions have resulted in changes to the natural plant communities within and surrounding the Plan Area. Most notably is the conversion of native communities to support agricultural crop production and livestock grazing. Other activities, including rural development, transportation, oil and gas pipelines, and electrical transmission lines have, to a lesser degree, also caused changes in the native plant communities. These past and present actions have resulted in temporary and permanent loss of native plant communities, fragmentation of contiguous communities, and introduction and

spread of noxious plant species. Reasonably foreseeable actions are likely to cause similar changes to natural plant communities within and surrounding the Plan Area. Implementation of the Proposed Alternative would contribute temporary and permanent effects on plant communities in the Plan Area. As much of the vegetation communities in the Plan Area have experienced some degree of alteration and fragmentation, the contribution of effects from implementation of the Proposed Alternative is considered lower in severity and degree than if effects occurred in undisturbed and contiguous vegetation communities. Cumulative effects associated with the Proposed Alternative would be minimized through implementation of several mitigation measures identified in the HCP, including revegetation.

General Wildlife

Past and present actions have impacted wildlife and their habitats within and surrounding the Plan Area. Actions that resulted in the loss, fragmentation, and alteration of wildlife habitats have likely impacted species richness and abundance, and species community assemblages. Similar to the impact analysis for the Proposed Alternative, impacts on wildlife from past, present, and reasonably foreseeable futures actions likely includes direct injury and mortality to individuals, wildlife displacement and disturbance, and alteration and loss of suitable habitats. Potential impacts on wildlife associated with implementation of the Proposed Alternative would contribute to those associated with past, present, and reasonably foreseeable actions. These impacts would be minimized through implementation of mitigation measures included in the HCP.

Covered Species

The ABB is the only federally listed species for which take would be permitted under the Proposed Alternative. Past, present, and reasonably foreseeable actions have resulted, and will result, in cumulative impacts on the ABB. Past and present actions within and surrounding the Plan Area have resulted in cumulative, long-term adverse effects on the ABB. Future actions within and near the Plan Area also have the potential to contribute long-term adverse effects on the ABB. As a federally listed species, potential impacts from future federal projects have the potential to be avoided, minimized, and mitigated under ESA Section 7 and Section 10. When combined with past, present, and reasonably foreseeable actions, implementation of the Proposed Alternative would contribute to adverse effects on the ABB within the Plan Area. As a result of the ESA consultation process, the Service ensures the cumulative amount of take of the ABB allocated to permittees does not jeopardize the continued existence of the species.

Bald Eagle and Other Raptors

Past, present, and reasonably foreseeable future actions have resulted, and will result, in cumulative impacts on bald eagles and other raptors within and near the Plan Area. As described for other wildlife species and groups, these impacts include direct injury and mortality, disturbance and displacement, and alterations to the availability and suitability of preferred habitats. When combined with past, present, and reasonably foreseeable future actions, implementation of the Proposed Alternative (construction of the proposed wind energy facility) could contribute to cumulative impacts on the bald eagle and other raptor species in the Plan Area. These cumulative impacts would likely be in the form of short-term displacement and disturbance and potential habitat alteration or loss. The HCP includes several measures to avoid, minimize, and mitigate potential impacts to bald eagles and raptors during construction of the proposed project. Implementation of the Proposed Alternative would not be expected to result in take of bald eagles or other raptor species in the short-term. To minimize potential long-term impacts associated with project operations, the Project would develop and implement an ECP.

Soils

Past, present, and reasonably foreseeable future actions have the potential to impact soils in the Plan Area. Potential impacts include site clearing, grading, excavating, and soil stockpiling. Implementation of the Proposed Alternative would result in a cumulative impact to soils because it includes these same activities. These cumulative impacts would be minimized through successful implementation of several mitigation measures, including measures related to erosion control, stormwater BMPs, and revegetation.

Visual Resources

Past, present, and reasonably foreseeable future actions have resulted, and will result, in impacts to the visual resources in the Plan Area. Implementation of the Proposed Alternative would contribute to the long-term cumulative impacts on visual resources in the Plan Area by adding wind turbines, associated transmission structures, and associated lighting.

Noise

Past, present, and reasonably foreseeable future actions have resulted, and will result, in noise impacts in the Plan Area. Implementation of the Proposed Alternative and the related construction activities and associated traffic would contribute to the cumulative noise impacts. However, these impacts would be reduced through implementation of several measures presented in the HCP, including restriction to construction hours.

Cultural Resources

Past, present, and reasonably foreseeable future actions have resulted, and will result, in impacts to cultural resources. Impacts have likely occurred during soil disturbing activities and artifact collection. Implementation of the Proposed Alternative would not be expected to contribute to the cumulative impacts of known cultural resources based on compliance with state and federal laws that protect and mitigate impacts to cultural resources.

4.4 IRREVERSIBLE AND IRRETRIEVABLE COMMITMENT OF RESOURCES

Irreversible resource commitments are related to the use of nonrenewable resources, such as energy, minerals, and soils, and the effects the uses might have on future generations. These uses are considered irreversible commitments because the resource has deteriorated to the point that renewal can only occur over long periods, at great expense, or because such impacts would cause the resource to be destroyed or removed. Irretrievable resource commitments refer to a loss of production or use of a resource. Irretrievable commitment refers to the permanent loss of a resource, such as extinction of a species, destruction of a cultural resource site, or loss of soil productivity.

Under the Proposed Alternative most resource commitments would not be irreversible or irretrievable. Potential impacts on the ABB would be both short-term and long-term. When a Covered Activity impacts the ABB and results in take, the Applicant would reduce impacts from take through implementation of AMMs included in the HCP and offset other impacts by conserving in perpetuity other unaffected ABB habitat using mitigation ratios approved by the Service.

Other resources that support ABB habitat that may have a possible irreversible or irretrievable commitment include vegetation and wildlife resources. Removal of vegetation would represent an irretrievable commitment of resources but would be characterized as low based on the relatively small amount of permanent vegetation loss compared to the amount of vegetation within the proposed project area. Mortality of wildlife during implementation of the Covered Activities would represent an

irretrievable commitment of resources but would not be important because these losses would not be expected to cause changes to local populations or impact ecosystem structure or function. Construction of wind turbines, other associated facilities, and a transmission line would alter the visual landscape associated with the proposed project and result in an irreversible impact on visual resources for the life of the Project

4.5 SHORT-TERM USE OF THE ENVIRONMENT VERSUS LONG-TERM PRODUCTIVITY

Implementation of the Proposed Alternative would result in short-term and long-term impacts to physical, biological, and social resources. Short-term uses of the environment associated with implementation of Covered Activities would include temporary land disturbance of natural and physical resources both outside and within ABB habitats. Long-term impacts associated with the facilities and structures that would remain in place for the life of the project are not expected to affect natural resources to any substantial or important degree. Long-term productivity would be unaffected by the short-term uses associated with the proposed Covered Activities. Additionally, it is possible that implementation of the Covered Activities, including the commitment to preserve in perpetuity other non-affected ABB habitats would contribute to and benefit long-term productivity for all resources.

5.0 CONSULTATION / PREPARERS

5.1 CONSULTATION AND COORDINATION

The following agencies and organizations were consulted during the preparation of the EA/HCP process.

FEDERAL AND STATE AGENCIES

Oklahoma Department of Wildlife Conservation

Oklahoma Archaeological Survey

Oklahoma State Historic Preservation Office

TRIBES

Chickasaw Nation

5.2 EA PRPEPARES / REVIEWERS

The following Service personnel and consultants contributed to the preparation of this EA.

Alisha Autio	U.S. Fish and Wildlife Service	NEPA Manager
Laurence Levesque	U.S. Fish and Wildlife Service	Biologist
Michelle Durflinger	U.S. Fish and Wildlife Service	Regional Office
Kristen Madden	U.S. Fish and Wildlife Service	Regional Office, migratory birds
Randy Schroeder	ENValue	NEPA Lead
Steven Faulk	ENValue	NEPA Writer

6.0 REFERENCES

- Atkinson-Palombo, C, and B. Hoen. 2014. Relationship between Wind Turbines and Residential Property Values in Massachusetts. A Joint Report of University of Connecticut and Lawrence Berkeley National Laboratory. January 9, 2014. Available on the internet: <http://files.masscec.com/research/RelationshipWindTurbinesandResidentialPropertyValuesinMassachusetts.pdf>. Accessed on September 13, 2018.
- Blanton & Associates. 2018a. Archeological Resources Survey of the Diamond Spring Wind Project in Johnston and Pontotoc Counties, Oklahoma. July 2018.
- Blanton & Associates. 2018b. Non-Archeological Historic Resources Survey Report, Diamond Spring Wind Project, Johnston and Pontotoc Counties, Oklahoma. July 2018.
- Blanton & Associates. 2019. Waters of the U.S. Delineation Diamond Spring Wind Project. August 2019.
- Bedick, J.C., W.W. Hoback, and M.C. Albrecht. 2006. High water loss rates and rapid dehydration in burying beetle, *Nicrophorus marginatus*. *Physiological Entomology*. 31: 23-29.
- Cowardin, L. M. V. Carter, F. C. Golet, and E. T. LaRoe. 1979. Classification of wetlands and deepwater habitats of the United States. U.S. Dep. Interior, Fish and Wildl. Serv. FWS/OBS - 79/31. Available on the internet: <https://www.fws.gov/wetlands/Documents/Classification-of-Wetlands-and-Deepwater-Habitats-of-the-United-States.pdf>.
- Diamond Spring Wind, LLC. 2019. Bird and Bat Conservation Strategy.
- Diamond Spring Wind, LLC. 2019. Habitat Conservation Plan for the American Burying Beetle. Diamond Spring Wind Project. Pontotoc and Johnston Counties, Oklahoma. August 23, 2019.
- FEMA (Federal Emergency Management Agency) 2018. FEMA Flood Map Service Center: Search by Address. Available on the internet: <https://msc.fema.gov/portal/search?AddressQuery=Sulphur%2C%20Oklahoma#searchresultsanchor>. Assessed on August 18, 2018.
- FHA (Federal Highway Administration). 2006. Construction Noise Handbook. Available on the internet https://www.fhwa.dot.gov/environment/noise/construction_noise/handbook/. Accessed on November 8, 2018.
- Loss, S.R., T. Will, and P. Marra. 2013. Estimates of Bird Collision Mortality at Wind Facilities in the Contiguous United States. *Biological Conservation* 168: 201-209. Available at: <https://www.fws.gov/migratorybirds/pdf/management/lossetal2013windfacilities.pdf>. Accessed September 16, 2019.
- Oklahoma Department of Environmental Quality (ODEQ). 2019. 2017 Reported Emissions Data – updated June 26, 2019. Available at: https://www.deq.ok.gov/wp-content/uploads/air-division/EI_ODEQ_2017ReportedEmissions.xlsx. Accessed on September 16, 2019.
- ODEQ (Oklahoma Department of Environmental Quality). Integrated Water Quality Assessment. Available on the internet: http://www.deq.state.ok.us/wqdnew/305b_303d/. Assessed on August 18, 2018.
- Oklahoma Department of Wildlife Conservation (ODWC). 2005. Oklahoma Comprehensive Wildlife Conservation Strategy. Available on the internet <https://www.wildlifedepartment.com/cwcs/ApprovedOKCWCsintroduction.pdf>. Accessed September 6, 2018.

- Resource Systems Group, Incorporated. 2019. Diamond Spring Wind Vibration Analysis. Final Report. Submitted by RSG Inc. January 30, 2019.
- Smith Environmental and Research Consulting House (SEARCH). 2018a. American Burying Beetle Presence/Absence Survey Report for the DSW Project. Final Report Submitted by Amy Smith. June 11, 2018.
- Smith Environmental and Research Consulting House (SEARCH). 2018b. Habitat Assessment, Diamond Spring Project. June 25, 2018.
- Smith Environmental and Research Consulting House (SEARCH). 2018c. American Burying Beetle Late Season 2018 Presence/Absence Survey Report for the Diamond Spring Wind Project. August 23, 2018.
- U.S. Census Bureau. 2018. QuickFacts Johnson and Pontotoc Counties. Available on the internet <https://www.census.gov/quickfacts/fact/table/johnstoncountyoklahoma/PST045217>. Accessed September 6, 2018.
- USDA. 2018. NRCS Web Soil Survey (WSS). Available on the internet: <https://websoilsurvey.sc.egov.usda.gov/App/HomePage.htm>. Accessed on August 7, 2018.
- U.S. Environmental Protection Agency (EPA). 2016. Water Body Quality Assessment Report. 2016. Appendix C. [http://www.deq.state.ok.us/wqdnew/305b_303d/2016/2016%20Appendix%20C%20-%20303\(d\)%20List.pdf](http://www.deq.state.ok.us/wqdnew/305b_303d/2016/2016%20Appendix%20C%20-%20303(d)%20List.pdf). Accessed on November 5, 2018.
- U.S. Environmental Protection Agency (EPA). 2018. How's My Waterway? Available on the internet: <https://watersgeo.epa.gov/mywaterway/rlist.html>. Accessed on November 5, 2018.
- U.S. Fish and Wildlife Service (USFWS). 1989. Final Rule. Endangered and Threatened Wildlife and Plants; Determination of Endangered Status for the American Burying Beetle. Federal Register 54 (133) pp 29652-29655. Available on the internet https://ecos.fws.gov/docs/federal_register/fr1559.pdf. Accessed on September 6, 2018.
- U.S. Fish and Wildlife Service. 1991. American Burying Beetle (*Nicophorus americanus*) Recovery Plan. 81 pages. Available on the internet <https://www.fws.gov/southdakotafieldoffice/ABBRecoveryPlan.pdf>. Accessed September 6, 2018.
- U.S. Fish and Wildlife Service. 2007. National Bald Eagle Management Guidelines. U.S. Fish and Wildlife Service. May 2007. Available on the internet: <https://www.fws.gov/southdakotafieldoffice/NationalBaldEagleManagementGuidelines.pdf>. Accessed September 23, 2019.
- U.S. Fish and Wildlife Service. 2014. American Burying Beetle Conservation Strategy for the Establishment, Management, and Operations of Mitigation Lands. U.S. Fish and Wildlife Service, Southwest Region. May 21, 2014. 30 pages.
- U.S. Fish and Wildlife Service. 2016. American Burying Beetle Impact Assessment for Project Reviews. U.S. Fish and Wildlife Service, Southwest Region, Oklahoma Ecological Services Field Office. March 6, 2014. 21 pages.
- Woods, A.J., Omernik, J.M., Butler, D.R., Ford, J.G., Henley, J.E., Hoagland, B.W., Arndt, D.S., and Moran, B.C., 2005. Ecoregions of Oklahoma (color poster with map, descriptive text, summary tables, and photographs): Reston, Virginia, U.S. Geological Survey (map scale 1:1,250,000).
- Yares, L.K., K.K. Lee, C.L. Hall, and D. R. Howard. 2014. Vibrational Noise Influences Reproductive Behavior in a Sub-Soil Breeding Necrophilous Insect. Research Poster. Augustana Symposium 2014.

Available on the internet: http://www.tgp-docents.com/docentnews/DNL-201504/Augustana-Symposium-L_Yares-Wind-Turbine-Vibration-2014.pdf; Accessed November 5, 2018.